CSEE W4840 Embedded System
Project Proposal

The Evolution of a Smile

A genetic algorithm with FPGA implementation

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Overview

Our project will implement Genetic Algorithm to generate Mona Lisa or any other images from polygons which are generated by DNA sequence. The goal of this project is to demonstrate Genetic Algorithm and do optimization using FPGA acceleration.

Further Specification

The whole system will first take a picture of user from USB camera and then use the picture taken as the picture for Genetic Algorithm to generate. After millions of generations, user should recognize the generated picture. Instead of creating just one new DNA to compare, FPGA would generate multiple simultaneously and compare them in parallel.

I/O

Input: USB Camera
Several Keys on Board to give control signals
Output: VGA output real-time generated picture and original picture

Algorithm Description

Starting from hill climbing Genetic Algorithm like mutating and comparison. Optimizing with merits of FPGA to accelerate the Algorithm.

Milestones

1. Implement algorithm on PC
2. Setup FPGA environments with all drivers configured
3. Display picture on screen
4. Implement Genetic Algorithm on FPGA
5. Add user interfaces and closing the project

References

http://rogeralsing.com/2008/12/07/genetic-programming-evolution-of-mona-lisa/